

CLAIMS

What is claimed is:

1. A lens system for reconfiguring the cornea and holding the reconfigured cornea during a laser treatment, said system comprising:
 - a lens member having an anterior surface and formed with a contact surface opposed to said anterior surface;
 - a skirt for forming a seal against the exterior surface of the eye, said skirt surrounding said contact surface and projecting outwardly therefrom to define a recessed chamber therebetween, said recessed chamber having an opening:
 - a passageway positioned substantially adjacent to said contact surface, said passageway in fluid communication with said recessed chamber; and
 - suction means in fluid communication with said passageway for creating a partial vacuum in said recessed chamber to draw the cornea into said recessed chamber and reconfigure the cornea against said contact surface when said cornea is placed over said opening of said skirt.
2. A system as recited in claim 1 wherein said skirt is formed with an inner surface for contact with the exterior surface of the eye, said inner surface having a concave shape extending into said recess to facilitate a seal between said skirt and said exterior surface of the eye when said cornea is placed over said opening of said skirt.
3. A system as recited in claim 1 wherein said contact surface is substantially flat.
4. A system as recited in claim 1 wherein said contact surface is curved.

5. A system as recited in claim 1 wherein said skirt is formed with a groove substantially adjacent to said contact surface and said passageway is formed within said groove to establish a suction channel between said contact surface and said skirt.
6. A system as recited in claim 1 wherein said lens member is transparent.
7. A system as recited in claim 1 further comprising a means for mounting said lens member and said skirt to a laser system.
8. A device for reconfiguring the anterior surface of the cornea for ophthalmic laser surgery which comprises:
an optical element having an anterior side and a posterior side, said posterior side being formed with a recessed chamber and having a contact surface and a sealing surface; and
suction means connected in fluid communication with said recessed chamber to draw the cornea into the chamber and reconfigure the cornea against said contact surface when said sealing surface is pressed against the exterior surface of the eye.
9. A device as recited in claim 8 wherein said contact surface is substantially flat.
10. A device as recited in claim 8 wherein said contact surface is curved.
11. A device as recited in claim 8 wherein said sealing surface is concave extending into said recessed chamber and formed of a soft, medical grade plastic.
12. A device as recited in claim 8 wherein said posterior side is formed with a groove adjacent to said contact surface, and further comprising a passageway having a first end in contact with said groove and a second end in fluid communication with said suction

means, said groove for transmitting a suction force to said contact surface to reconfigure the cornea and hold the reconfigured cornea against the contact surface during ophthalmic laser surgery.

13. A device as recited in claim 8 further comprising a retainer ring, said optical element being mounted on said retainer ring and further, wherein said retainer ring is attached to a laser system.
14. A method for ophthalmic laser surgery which comprises the steps of:

providing a lens having a lens member, said lens member formed with an anterior surface and a contact surface, said contact surface being opposed to said anterior surface, said lens having a skirt surrounding said contact surface and extending outwardly therefrom to define a recessed chamber therebetween, said skirt having a sealing surface, and said lens further having a suction means in fluid communication with said recessed chamber for creating a partial vacuum therein between said contact surface and the cornea;

placing said sealing surface of said skirt against the exterior surface of the eye;

creating a partial vacuum in said recessed chamber with said suction means to draw the cornea into said recessed chamber and reconfigure the cornea against said contact surface; and

passing a laser beam through said anterior surface and said contact surface and into the cornea to perform ophthalmic laser surgery.

15. A method as recited in claim 14 wherein said contact surface is substantially flat.
16. A method as recited in claim 14 wherein said contact surface is curved.

17. A method as recited in claim 14 wherein said sealing surface is concave extending into said recessed chamber and formed of a soft, medical grade plastic.
18. A method as recited in claim 14 wherein said contact surface is shaped to introduce less spherical aberration to said laser beam as said laser beam passes into the reconfigured cornea than is introduced into an identical laser beam passing into a cornea that is not reconfigured.
19. A lens system for reconfiguring the cornea and holding the reconfigured cornea during a laser treatment, said system comprising:
 - a lens member having an anterior surface and formed with a contact surface opposed to said anterior surface, said contact surface shaped to reconfigure the cornea;
 - a skirt, said skirt surrounding said contact surface and projecting outwardly therefrom to define a recessed chamber therebetween, said recessed chamber having an opening; and
 - a means for maintaining said skirt and said lens member in position relative to the cornea.
20. A lens system as recited in claim 19 wherein said means for maintaining said skirt and said lens member in position relative to the cornea comprises:
 - a passageway positioned substantially adjacent to said contact surface, said passageway in fluid communication with said recessed chamber; and
 - suction means in fluid communication with said passageway for creating a partial vacuum in said recessed chamber to draw the cornea into said recessed chamber and reconfigure the cornea against said contact surface when said cornea is placed over said opening of said skirt.

21. A lens system as recited in claim 19 wherein said means for maintaining said skirt and lens member in position relative to the cornea comprises a plurality of projections, each said projection extending from said skirt for contact with the exterior surface of the eye.
22. A lens system as recited in claim 19 further comprising:
 - a means for mounting said lens member and said skirt to a laser system.
23. A lens system for use in corneal laser surgery which comprises:
 - a lens member having an anterior surface and formed with a contact surface opposed to said anterior surface, said contact surface shaped to reconfigure the cornea;
 - a skirt, said skirt surrounding said contact surface and projecting outwardly therefrom to define a recessed chamber therebetween, said recessed chamber having an opening;
 - a means for maintaining said skirt and said lens member in position relative to the cornea; and
 - a means for mounting said lens member and said skirt to a laser system.
24. A system for corneal laser surgery, said system comprising:
 - a lens member having an anterior surface and formed with a contact surface opposed to said anterior surface, said contact surface shaped to reconfigure the cornea;
 - a skirt, said skirt surrounding said contact surface and projecting outwardly therefrom to define a recessed chamber therebetween, said recessed chamber having an opening;
 - a means for maintaining said skirt and said lens member in position relative to the cornea; and
 - a laser source for producing a laser beam, said laser source positioned to pass said laser beam through said lens member.